Perceptual Processes:

Processing Approach in Perception

Top-Down Processing

The notion that recognition process begins from the whole, which leads to identification of its various components is known as top-down processing. The top-down approach lays emphasis on the perceiver, and considers perception as a process of recognition or identification of stimuli.

Bottom-up

The bottom-up approach lays emphasis on the features of stimuli in perception, and considers perception as a process of mental construction. Recognition process begins from the parts, which serve as the basis for the recognition of the whole

The perceiver

Motivation

The needs and desires of a perceiver strongly influence her/his perception. People want to fulfil their needs and desires through various means. One way to do this is to perceive objects in a picture as something that will satisfy their need

Expectation and perceptual set

The expectations about what we might perceive in a given situation also influence our perception. This phenomenon of perceptual familiarisation or perceptual generalisation reflects a strong tendency to see what we expect to see even when the results do not accurately reflect external reality.

Cognitive style

Cognitive style refers to a consistent way of dealing with our environment. It significantly affects the way we perceive the environment. There are several cognitive styles that people use in perceiving their environment.

Field dependent people perceive the external world in its totality, i.e., in a global or holistic manner. On the other hand, field independent people perceive the external world by breaking it into smaller units, i.e., in an analytic or differentiated manner.

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Cultural Background and Experiences

Different experiences and learning opportunities available to people in different cultural settings also influence their perception. People coming from a pictureless environment fail to recognise objects in pictures

Gestalt Approach to Perception

The word gestalt is to be describes as a psychological structure based on the formula that the whole is something more than the additive aggregate of its elements (parts and relations)

The process of gestalt-formation is generally regulated by the principle of figural organization i.e., the principle of proximity, similarity, continuity and frame of reference.

Gestalt Psychology was founded by Max Wertheimer (1923), Wolfgang Kohler (1947) and Kurt Koffka (1935)

"**The whole is greater than the sum of its part**"

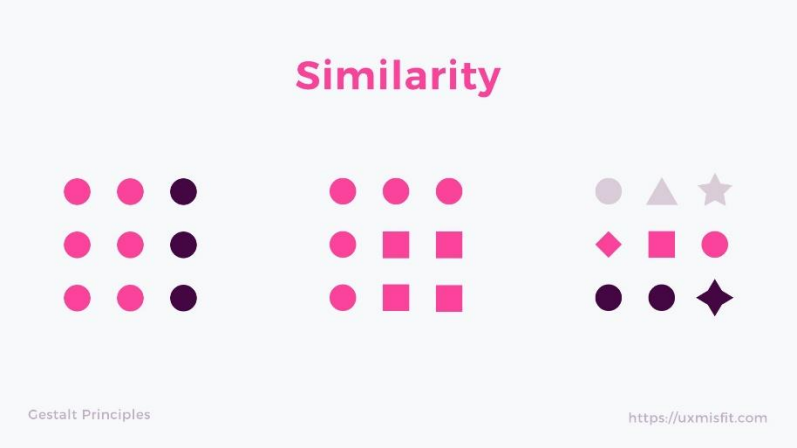
Law of perceptual organization

Law of Proximity

The **law of proximity** describes how the human eye perceives connections between visual elements. Elements that are close to each other are perceived to be related when compared with elements that are separate from each other.

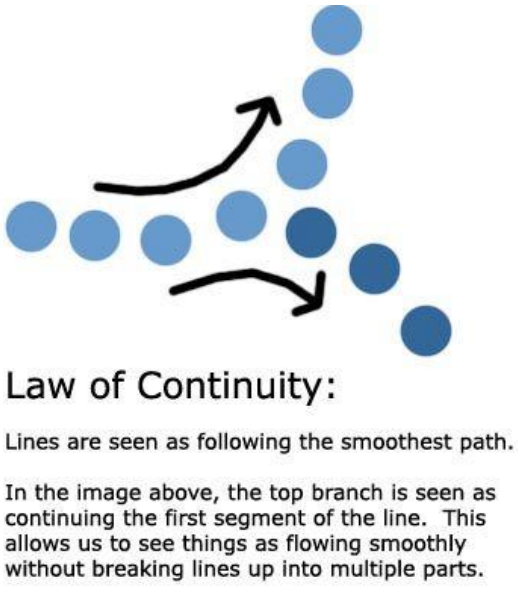
Law of Similarity

The **Law of Similarity** is the gestalt grouping **law** that states that elements that are similar to each other tend to be perceived as a unified group. **Similarity** can refer to any number of features, including colour, orientation, size, or indeed motion.



Law of continuity

The **law of continuity** holds that points that are connected by straight or curving lines are seen in a way that follows the smoothest path. Rather than seeing separate lines and angles, lines are seen as belonging together.

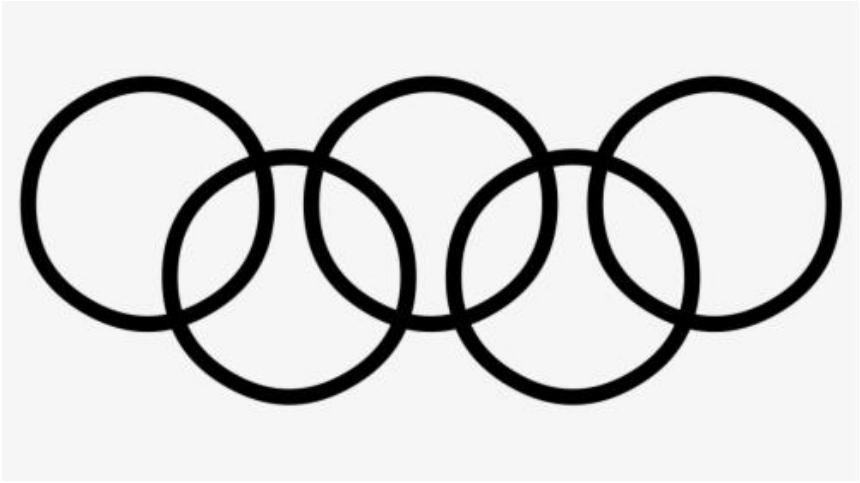

Law of Continuity:
Lines are seen as following the smoothest path.
In the image above, the top branch is seen as continuing the first segment of the line. This allows us to see things as flowing smoothly without breaking lines up into multiple parts.

Law of Common Fate

Law of Common Fate is the gestalt grouping **law** that states that elements that are moving together tend to be perceived as a unified group. Think of watching a flock of geese moving across a fall sky. The geese are all flying the same direction at approximately the same speed.

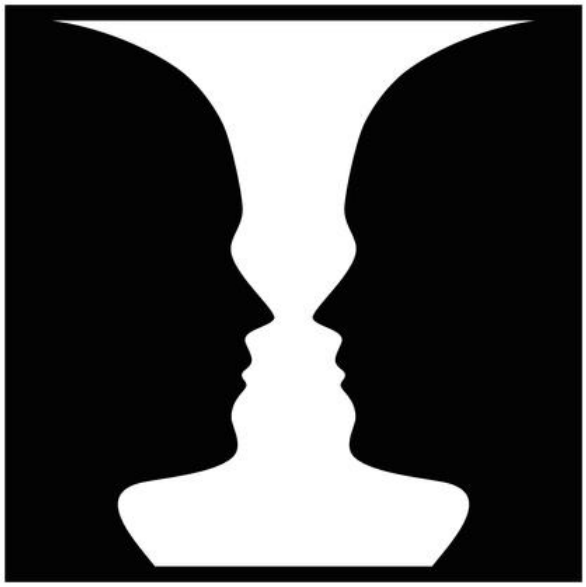
Law of Pragnanz

The word **pragnanz** is a German term meaning "good figure." The **law of Pragnanz** is sometimes referred to as the **law** of good figure or the **law** of simplicity. This **law** holds that objects in the environment are seen in a way that makes them appear as simple as possible.



Law of Figure-Ground

The **law of Figure/Ground** states that we can distinguish an object (the **figure** of the rule) from background (the **ground**). This rule shows that when we look at a design, we perceive the **figure** from the **ground** distinctly.



Perceptual Constancy

Size Constancy- The size of an image on our retina changes with the change in the distance of the object from the eye. The further away it is, the smaller is the image. On the other hand, our experience shows that within limits the object appears to be about the same size irrespective of its distance.

Shape Constancy -In our perceptions the shapes of familiar objects remain unchanged despite changes in the pattern of retinal image resulting from differences in their orientation.

Brightness Constancy -The tendency to maintain apparent brightness constant under different amount of illumination is called brightness constancy

Perception of Space, Depth and Distance

The process of viewing the world in three dimensions is called distance or depth perception

Depth Cues

In perceiving depth, we depend on two main sources of information, called cues. One is called binocular cues because they require both eyes. Another is called monocular cues, because they allow us to perceive depth with just one eye

Monocular Cues (Psychological Cues)

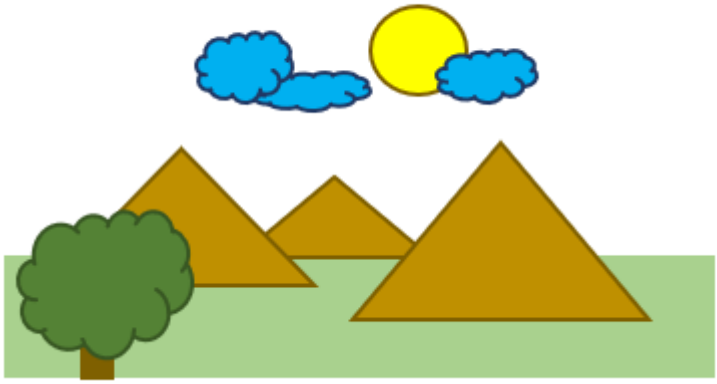
Monocular cues of depth perception are effective when the objects are viewed with only one eye. These cues are often used by artists to induce depth in two dimensional paintings. They are known as pictorial cues.

Relative Size

The size of retinal image allows us to judge distance based on our past and present experience with similar objects. As the objects get away, the retinal image becomes smaller and smaller. We tend to perceive an object farther away when it appears small, and closer when it appears bigger.

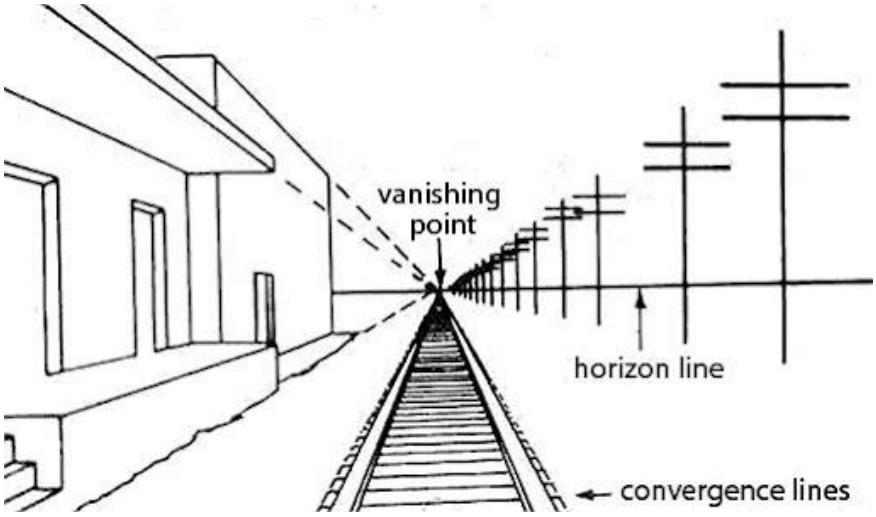
Interposition or Overlapping:

These cues occur when some portion of the object is covered by another object. The overlapped object is considered farther away, whereas the object that covers it appears nearer.



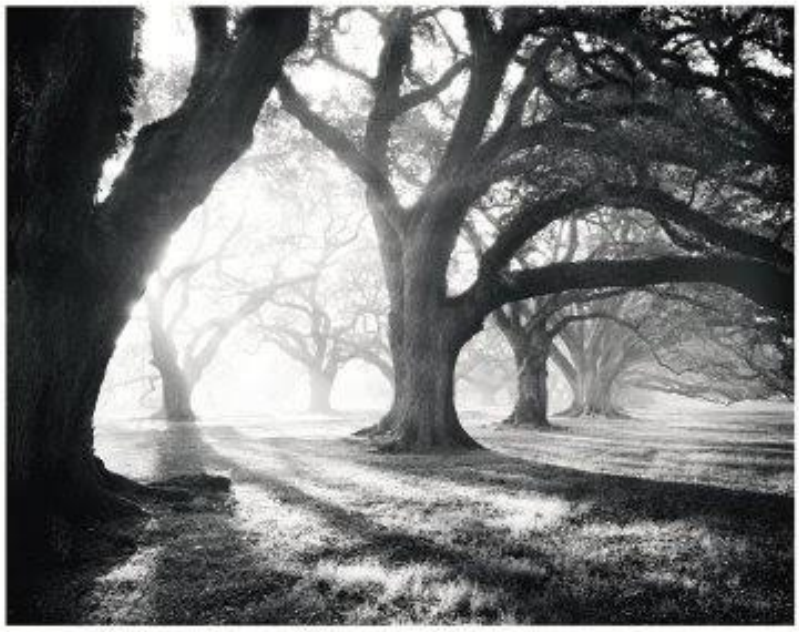
Linear Perspective: This reflects a phenomenon by which distant objects appear to be closer together than the nearer objects

For example, parallel lines, such as rail tracks, appear to converge with increasing distance with a vanishing point at the horizon. The more the lines converge, the farther away they appear.



Aerial Perspective: The air contains microscopic particles of dust and moisture that make distant objects look hazy or blurry. This effect is called aerial perspective

Light and Shade: In the light some parts of the object get highlighted, whereas some parts become darker. Highlights and shadows provide us with information about an object's distance.



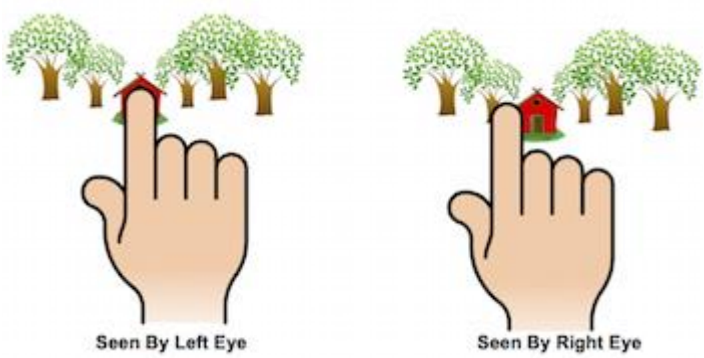
Relative Height: Larger objects are perceived as being closer to the viewer and smaller objects as being farther away. When we expect two objects to be the same size and they are not, the larger of the two will appear closer and the smaller will appear farther away.

Texture Gradient: It represents a phenomenon by which the visual field having more density of elements is seen farther away. In the Figure the density of stones increases as we look farther away.

Motion Parallax: It is a kinetic monocular cue, and hence not considered as a pictorial cue. It occurs when objects at different distances move at a different relative speed. The distant objects appear to move slowly than the objects. that are close. The rate of an object's movement provides a cue to its distance

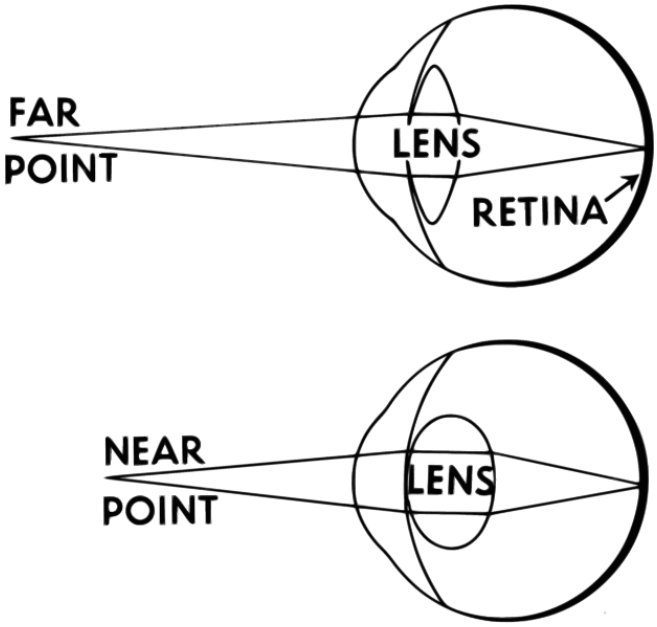
Binocular Cues (Physiological)

Retinal or Binocular Disparity: Retinal disparity occurs because the two eyes have different locations in our head. They are separated from each other horizontally by a distance of about 6.5 centimetres. Because of this distance, the image formed on the retina of each eye of the same object is slightly different. This difference between the two images is called retinal disparity. The brain interprets a large retinal disparity to mean a close object and a small retinal disparity to mean a distant object, as the disparity is less for distant objects and more for the near objects



Convergence: When we see a nearby object our eyes converge inward in order to bring the image on the fovea of each eye. A group of muscles send messages to the brain regarding the degree to which eyes are turning inward, and these messages are interpreted as cues to the perception of depth. The degree of convergence decreases as the object moves further away from the observer. You can experience convergence by holding a finger in front of your nose and slowly bringing it closer. The more your eyes turn inward or converge, the nearer the object appears in space.

Accommodation: Accommodation refers to a process by which we focus the image on the retina with the help of ciliary muscle. These muscles change the thickness of the lens of the eye. If the object gets away (more than 2 meters), the muscle is relaxed. As the object moves nearer, the muscle contracts and the thickness of the lens increases. The signal about the degree of contraction of the muscle is sent to the brain, which provides the cue for distance.



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